

Armed Forces College of Medicine

AFCM



Descending Pathways

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Lecturer of Anatomy

INTENDED LEARNING OBJECTIVES (ILO)

- **By the end of this section each of the student should be able to:**

1) **Identify the origin, course, distribution, termination, function and effects of lesion of cortico-spinal tract.**

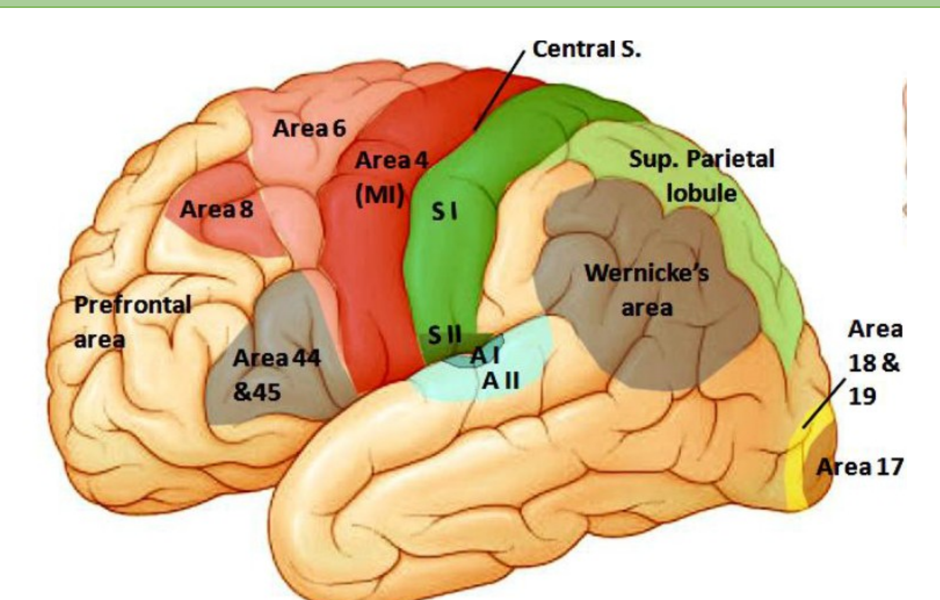
2) **Identify the origin, course, distribution, termination, function and effects of lesion of cortico-nuclear tract.**

3) **Differentiate between pyramidal and extrapyramidal systems.**



Pyramidal Tract

- **Origin:** From neurons in cerebral cortex. The majority of fibers arise from the motor area 4 and the premotor area 6.
- Some fibers arise from sensory areas S I & S II .



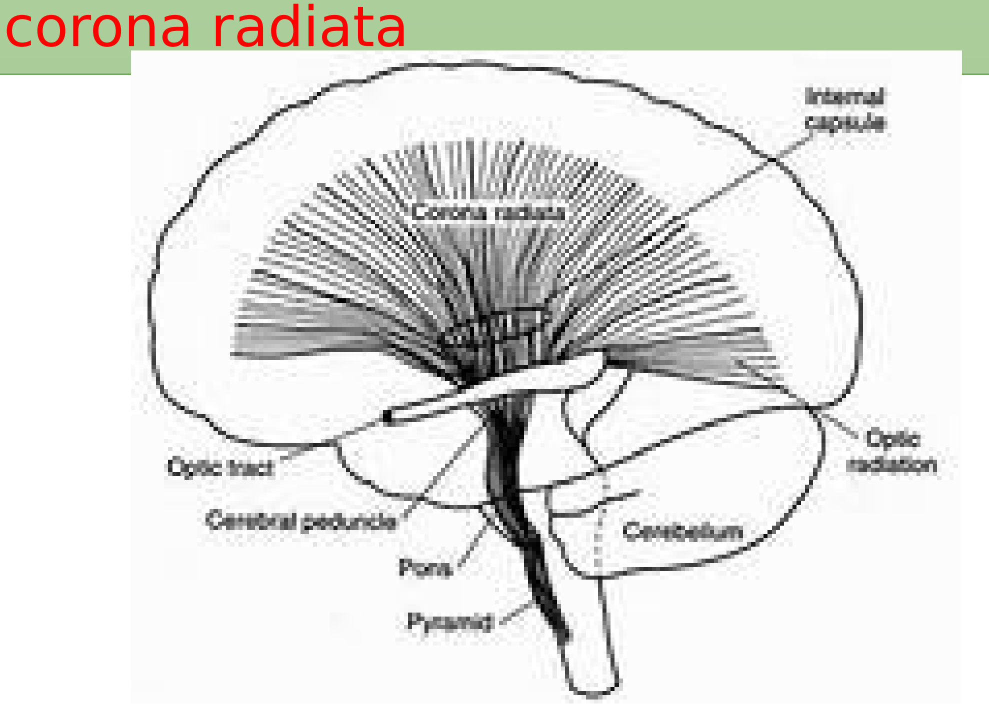
Motor cortex
Corona radiata
Internal capsule
Hip
Trunk
Arm
Hand
Foot
Face
Tongue
Larynx
Motor decussation
Crus Cerebri of midbrain
Lat. Cortico-Spinal T
Basis Pontis of pons
Ant. Cortico-Spinal T
Open medulla
Closed medulla
Spinal cord



Pyramidal Tract

Course:

1- Axons of neurons in the cerebral cortex descend and converge in the corona radiata



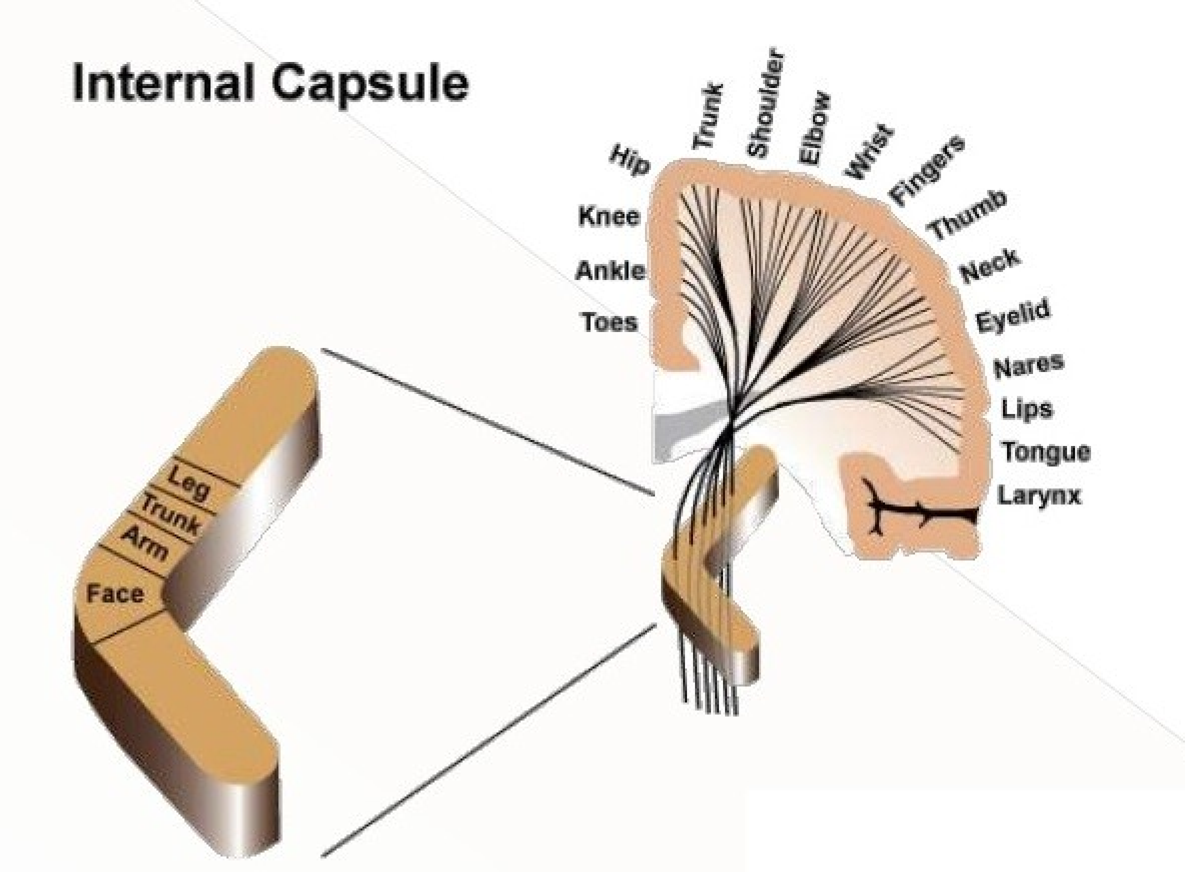
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Pyramidal Trac

❑Course:

- The axons then pass in the anterior 2/3 of posterior limb of internal capsule.



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❑Course:

- ➢In midbrain: Descend in the middle 3/5 of the crus cerebri.
- ➢In pons: Descend as scattered bundles in the basis pontis separated by the transverse pontine fibers.
- ➢In medulla oblongata: Fibers collect and form the pyramid.

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- **Decussation**:
- 80% of fibers cross in the lowermost part of the medulla forming the motor decussation then descend in the spinal cord as the lateral corticospinal tract.
- The uncrossed Fibers (20%) descend in the spinal cord as the anterior corticospinal tract. The uncrossed corticospinal fibers usually cross at a lower level (in the spinal cord)

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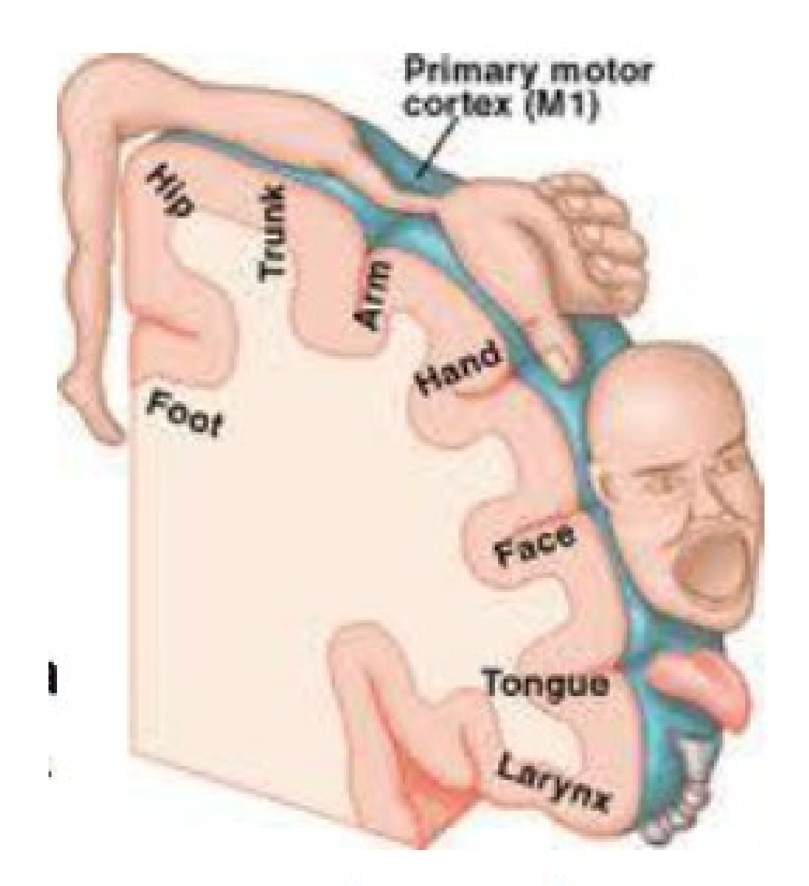


- **Termination:**
- 1- The crossed fibers (80%) end on the <u>lateral group</u> of anterior horn cells (AHCs) which supply the limbs.
- The uncrossed fibers (20%) end on the <u>medial group</u> of anterior horn cells (AHCs) of which supply the trunk).



- **Lamination:**

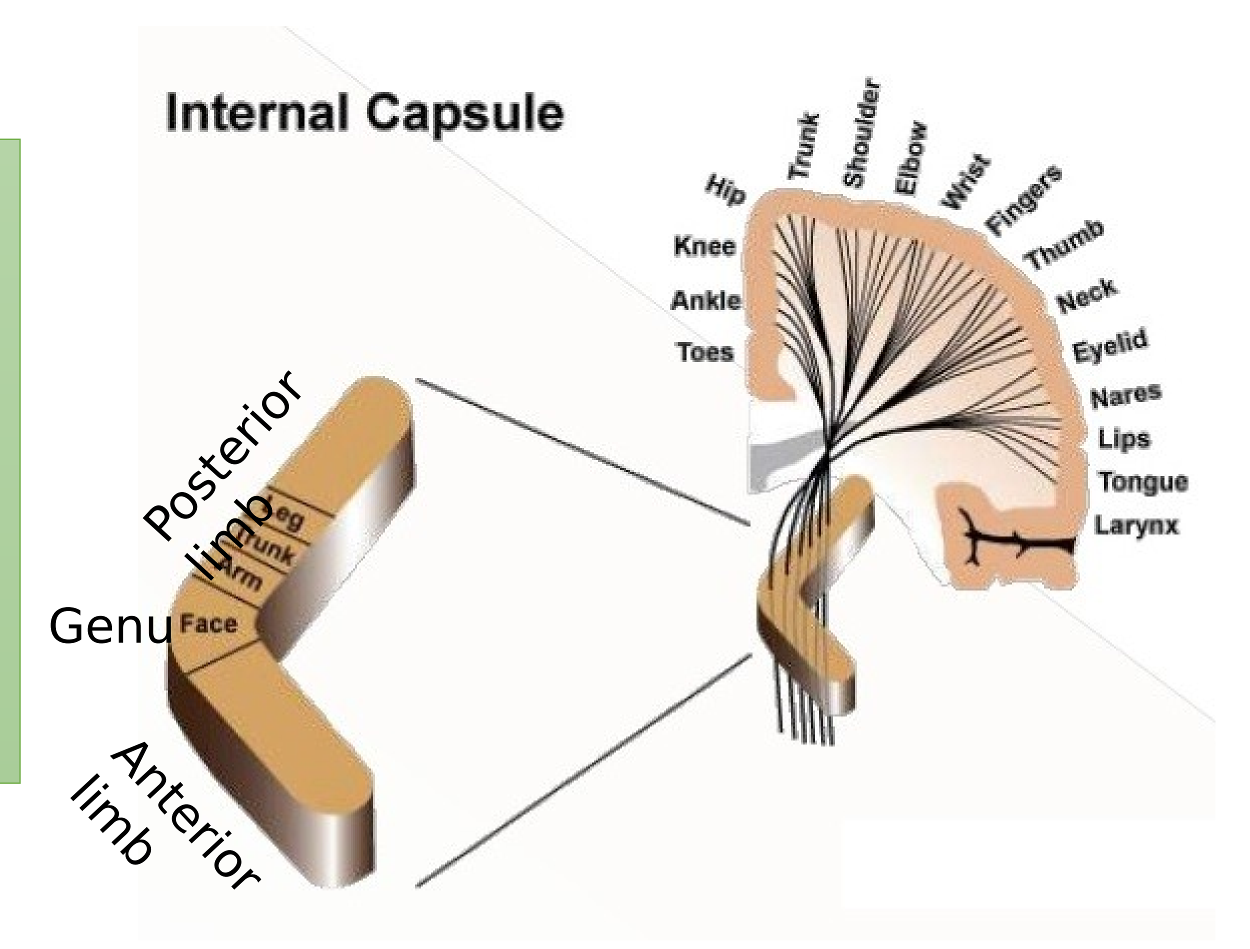
1- In the cerebral cortex: the body is represented upside down with the face area lowermost and foot area on the medial surface of the cerebral hemisphere.



motor homunculus

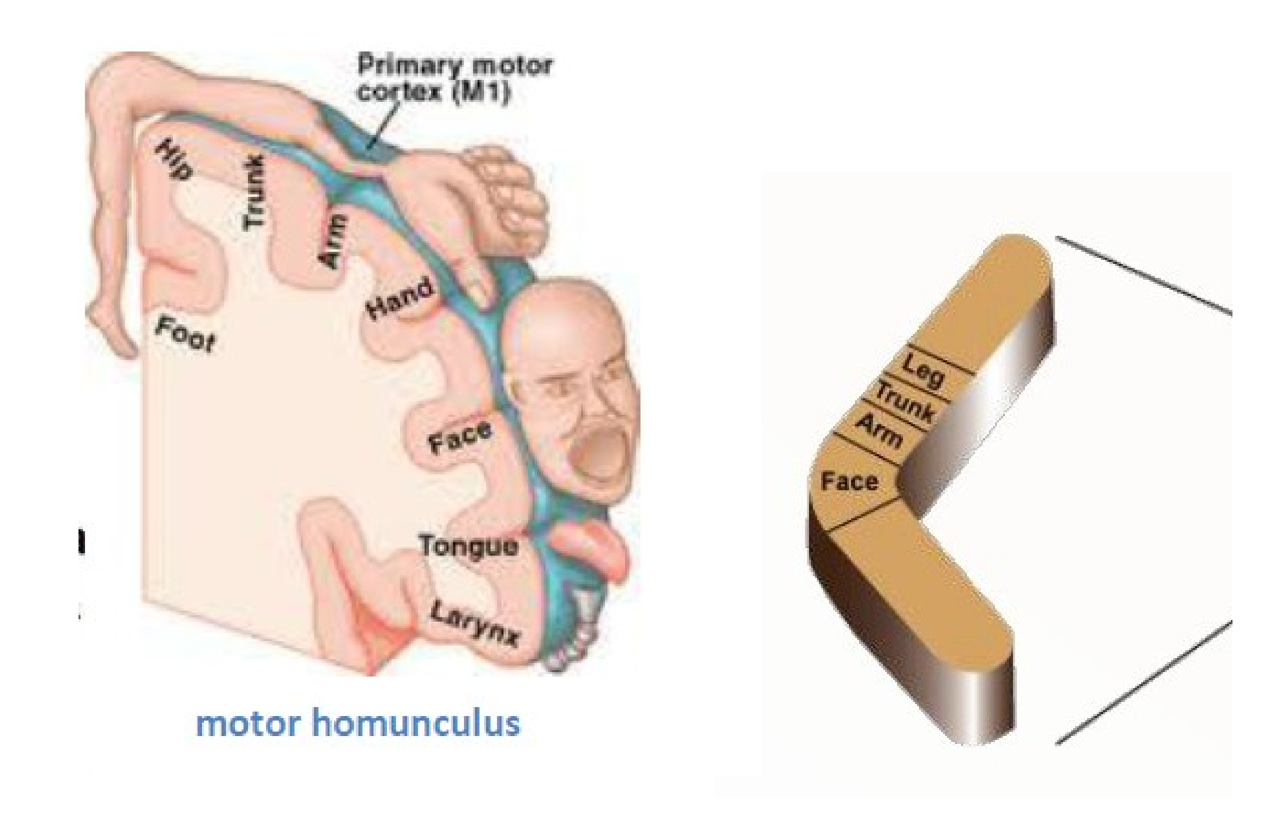


- **Lamination:**
- 2- In the internal capsule: fibers for face muscles are in the genu, upper limb area lie most anterior & lower limb area most posterior in the posterior limb of internal capsule.

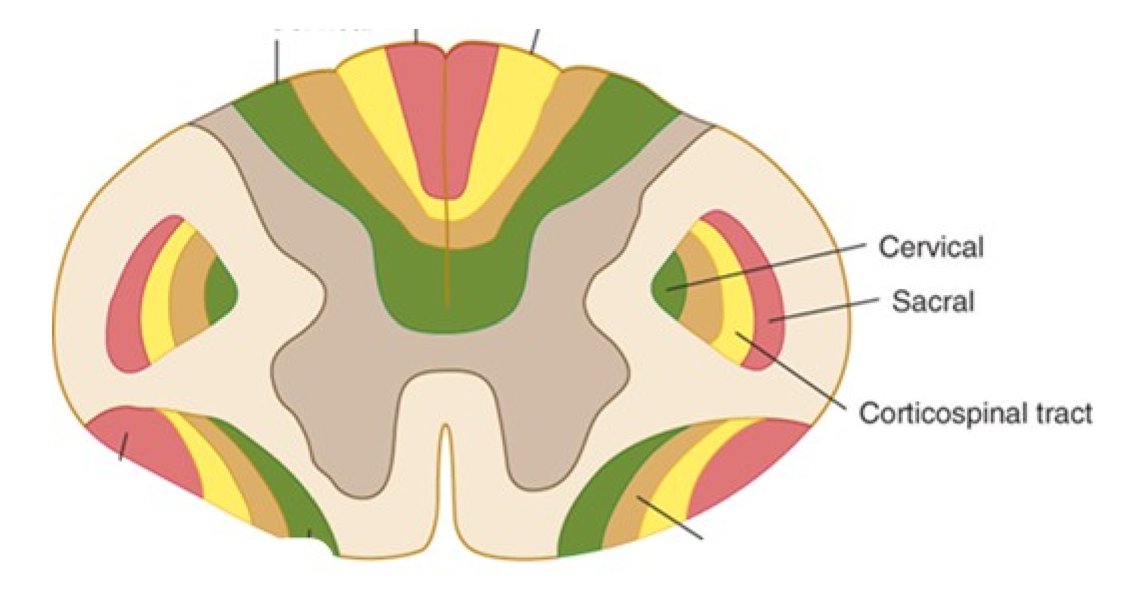




- **Lamination:**
- 3- In the midbrain & spinal cord: cervical fibers are medial while sacral fibers are lateral.



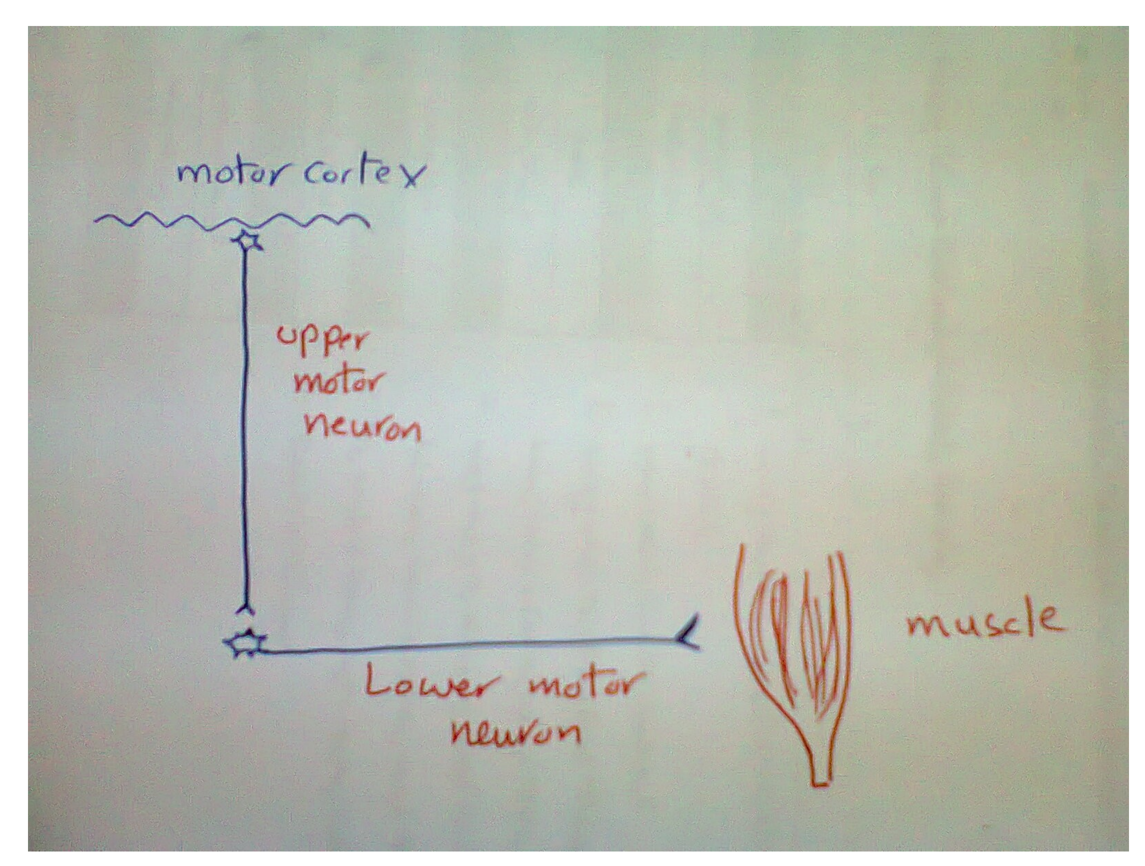
motor homunculus





- **Function:**
- The pyramidal tract is responsible for skilled voluntary movements in the distal parts of the limbs.





Pyramidal T. Voluntary movements

Suppressor fibers on muscle tone

Extrapyramidal T. Involuntary movements

UMNL

Stretch reflex

LMNL



Upper motor neuron lesion (UMNL)	Lower motor neuron lesion (LMNL)
Hyper-tonia	**Hypo-tonia**
Hyper-reflexia	**Hypo-reflexia**
+ve Babiniski sign	**-ve**
+ve Clonus	**-ve**
No atrophy	**Early atrophy**




Normal toe flexion


Positive Babinski's reflex







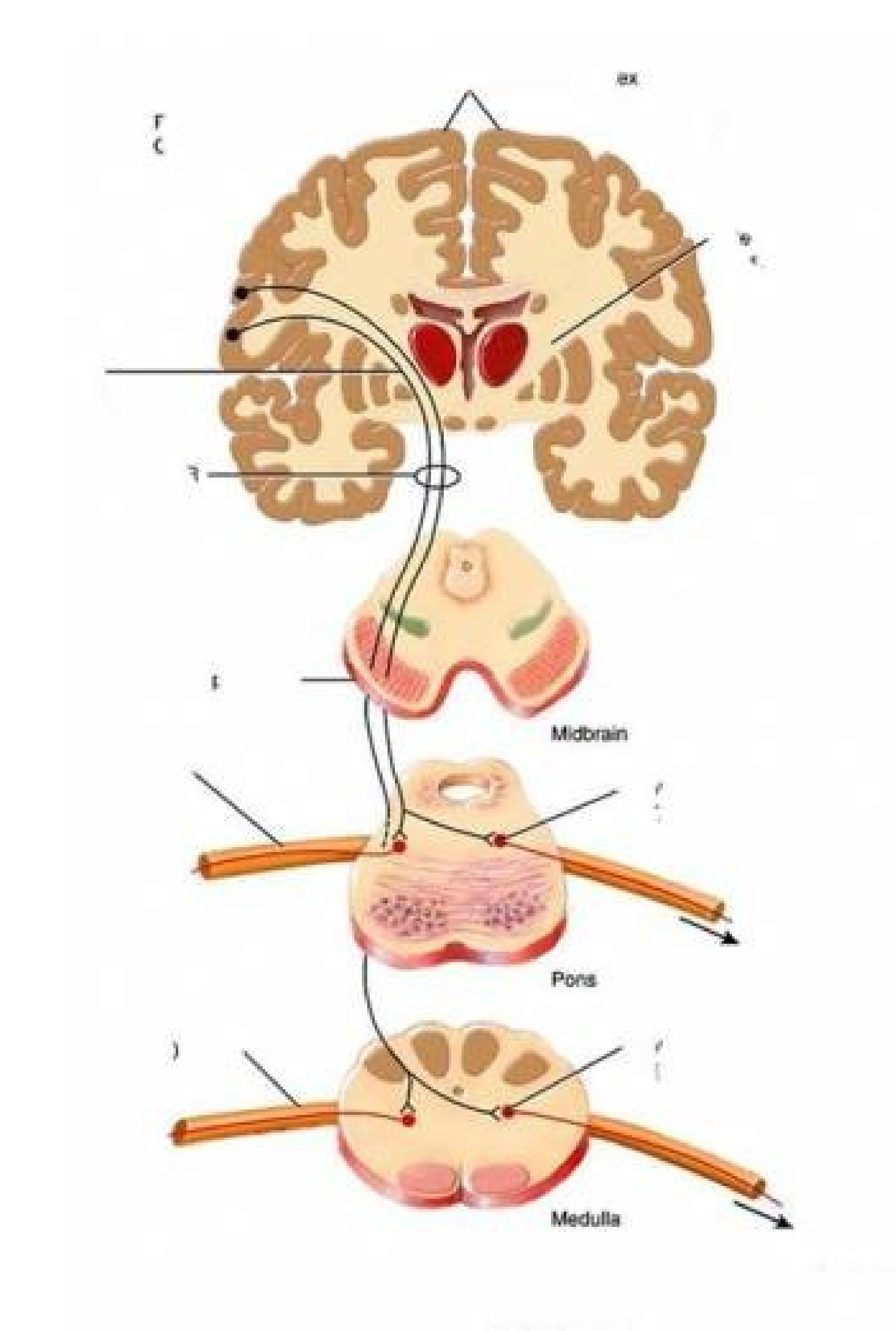




Cortico-nuclear tract
(corticobulbar tract)

- Origin: from lower part of area 4

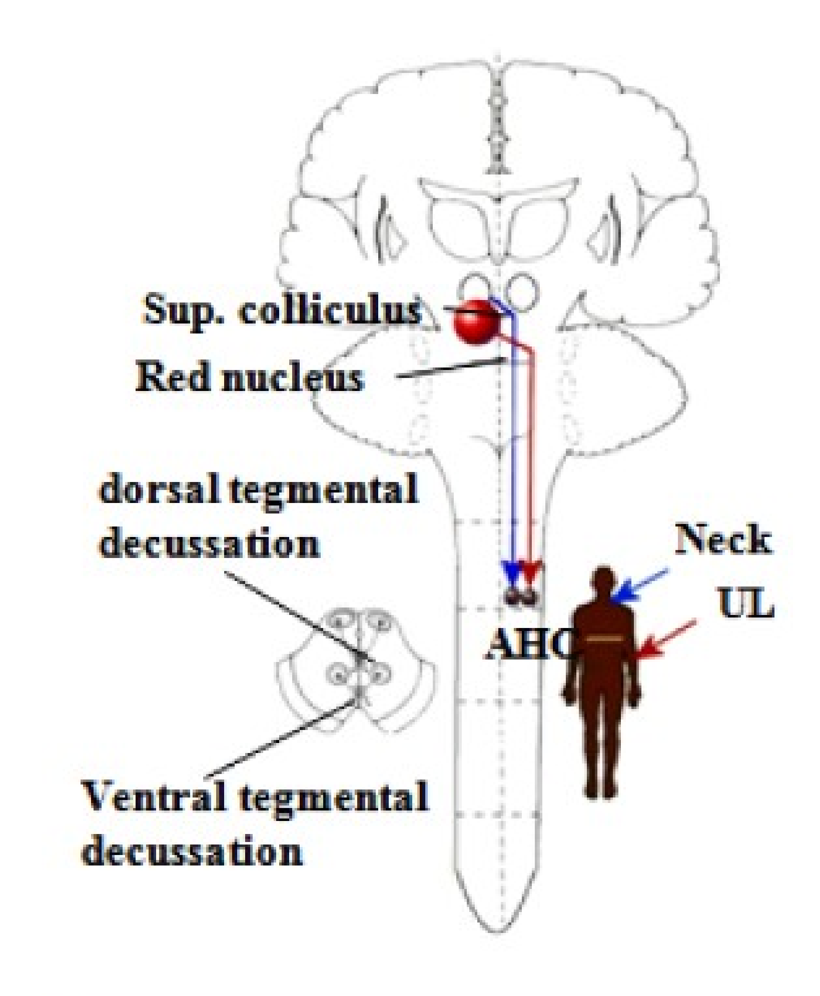
  (face area)
- Pass in genu of internal capsule.
- Terminate bilaterally on motor nuclei of cranial nerves.
- Exception: The lower ½ of VII and XII nuclei receive only from the





II. Extrapyramidal Tracts

- These are a group of descending tracts that may be excitatory or inhibitory to muscles.
- They are responsible for adjusting muscle tone, posture and the semiautomatic movements such as swinging the arm during walking.




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